

REMARKS/ARGUMENTS

The Examiner's Action mailed on March 27, 2003 has been received and its contents carefully considered. Additionally attached to this Amendment is a Petition for Extension of Time, extending the period for response to August 27, 2003.

In this Amendment, Applicants have amended the drawings and claims 17, 23, and 32, cancelled claims 1-4, 9-11, 24, 31, 38-39, and 44-46, and added claims 51-63. Claims 17, 23, and 32 are the independent claims. Claims 17, 23, 32, and 51-63 are now pending in the application. For at least the following reasons, it is submitted that this application is in condition for allowance.

The drawings have been objected to because Figures 2A, 2B, 6A, 6B, 7A, 8, 10B were improperly crosshatched. In particular, the Examiner stated that all of the parts shown in the section, and only those parts, must be crosshatched. In response thereto, a replacement set of formal drawings (5 sheets; Figures 2A, 2B, 6A, 6B, 7A, 8, 10B) is attached. It is submitted that these drawings comply with all official requirements, and it is thus requested that the objection be withdrawn.

Claims 1-4, 9-11, 17, 23-24, 31-32, 38-39, and 44-46 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. In response, claims 17, 23, and 32 have been editorially amended, taking the Examiner's comments into consideration. In addition, claims 1-4, 9-11, 24, 31, 38-39, and 44-46 have been cancelled. It is submitted that the claims 17, 23, and 32 comply with all official provisions, and it is requested that this rejection be withdrawn.

Claims 1-4, 9, 10, 11, 31, 38, 39, and 44-46 have been rejected as being anticipated by *Breitling et al.* (US Patent No. 4,675,788). Because these claims have been cancelled, this rejection has been rendered moot.

Claims 1, 17, 23, and 31-32 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Imai et al.* (US Patent No. 5,257,452). Because claims 1 and 31 have been canceled, Applicants will treat this rejection as applying only to pending claims 17, 23, and 32. It is submitted that these claims are patentably distinguishable over the cited reference for at least the following reasons.

Applicants' amended independent claim 17 recites a coaxial via hole structure for a carrier, wherein the carrier has a first hole. The coaxial via hole structure includes an outer cylinder-shaped conductor and an inner cylinder-shaped conductor, both of which extend along a first direction. The outer cylinder-shaped **conductor** has a second hole therethrough and the second hole has a diameter smaller than a diameter of the first hole. The outer cylinder-shaped conductor is formed on the interior of the first hole while the inner cylinder-shaped conductor is formed on the interior of the second hole, so that the inner cylinder-shaped conductor is disposed in the outer cylinder-shaped conductor. The coaxial via hole structure also includes an insulating fill between the outer cylinder-shaped conductor and the inner cylinder-shaped conductor. The outer cylinder-shaped conductor is connected to a signal conductor for signal shielding.

In accordance with Applicants' claimed invention, the coaxial via hole structure can be applied as a **capacitor**, having the function of signal shielding, and has the further advantages as discussed in detail throughout the specification. This claimed structure is neither disclosed nor suggested by the cited reference.

In contrast, *Imai et al.* disclose a through hole formed by a drill in a defective through hole in a board. An insulating resin (7) is coated on the inner surface of the through hole and a cylindrical conductor (14) is closely fixed with an adhesive (12) to the hole h1 to form a reproduced through hole. Thereafter, as usual, a part lead is inserted into and soldered in the reproduced through hole to thereby recover the connection of the lead with the wiring circuit copper foil impaired by the recovering operation of the defective through hole using an external lead. (Abstract; and Fig.1D)

The Examiner's Action has equated the insulating resin (7) disclosed by *Imai et al.* as being an outer cylinder-shaped conductor. However, the properties of the insulating resin (7) is obviously different from that of the outer cylinder-shaped conductor. That is, the insulator resin will insulate, while a conductor will conduct. Thus, the structure as revealed by *Imai et al.*, which is formed by the insulating resin (7), cylindrical conductor (14), and adhesive (12), can not be applied as a capacitor, as could be Applicants' coaxial via structure.

Moreover, there is no disclosure or suggestion from this reference that the outer cylinder-shaped conductor is connected to a signal conductor for signal shielding, as recited in the amended claim 17.

As such, it is submitted that Applicants' amended independent claim 17, as well as the claims 51-57 dependent therefrom, are *prima facie* patentably distinguishable over the cited reference.

Applicants' independent claim 23 recites that a conductor is connected to the outer cylinder-shaped conductor, and is connected to a signal conductor for signal

shielding. For reasons that should be clear from the foregoing discussion with respect to claim 17, it is respectfully submitted that claim 23 is patentably distinguishable over the applied reference.

Applicants' amended independent claim 32 recites a coaxial via hole structure for a carrier, wherein the carrier has a first hole. The coaxial via hole structure includes an outer cylinder-shaped conductor and an inner cylinder-shaped conductor, both of which extend along a first direction. The outer cylinder-shaped **conductor** has a second hole therethrough and the second hole has a diameter smaller than a diameter of the first hole. The outer cylinder-shaped conductor is formed on the interior of the first hole while the inner cylinder-shaped conductor is formed on the interior of the second hole, so that the inner cylinder-shaped conductor is disposed in the outer cylinder-shaped conductor. The coaxial via hole structure also includes an electrical-resistant fill between the outer cylinder-shaped conductor and the inner cylinder-shaped conductor. Moreover, the coaxial via hole structure further includes a conductor which is connected to the outer cylinder-shaped conductor and is connected to a signal conductor for signal shielding.

In accordance with this claim, the coaxial via hole structure can be applied as a **resistor**, having the function of signal shielding, shortening the trace path, reducing signal loss and delay, and having the further advantages as discussed in detail throughout the specification. The claimed structure is neither disclosed nor suggested by the cited reference.

The Examiner's Action has equated the insulating resin (7) revealed by *Imai et al.* as being an outer cylinder-shaped conductor, and the adhesive (12) as being an

electrical-resistant fill. However, the properties of the insulating resin (7) are obviously different from that of Applicants' claimed outer cylinder-shaped conductor. In particular, the structure as revealed by *Imai et al*, which is formed by the insulating resin (7), cylindrical conductor (14), and adhesive (12), can not be utilized as a resistor, as can be Applicants' coaxial via structure.

Moreover, there is no disclosure or suggestion from this reference that the coaxial via hole structure further includes a conductor which is connected to the outer cylinder-shaped conductor and is connected to a signal conductor for signal shielding, as recited in the amended claim 32.

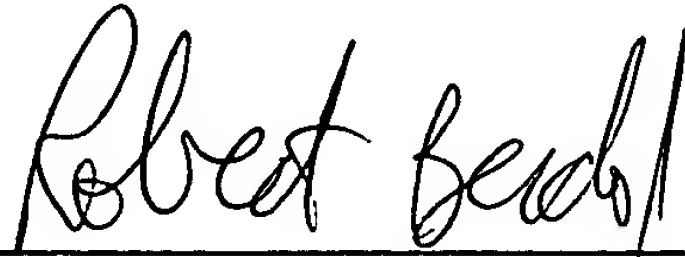
As such, it is submitted that Applicants' amended independent claim 32, as well as the claims 58-63 dependent therefrom, are *prima facie* patentably distinguishable over the cited reference. It is requested that this rejection be withdrawn.

Claims 24 has been rejected as being obvious over *Breitling et al*. in view of *Lee et al*. Because this claim has been cancelled, this rejection has been rendered moot.

Based on the above, it is submitted that all of the pending claims 17, 23, 32, and 51-63 are allowable over the cited references, so that this application is in condition for allowance. Such action and the passing of this case to issue are therefore respectfully requested.

If the Examiner believes that a conference would be of value in expediting the prosecution of this application, the Examiner is hereby invited to telephone the undersigned counsel to arrange for such a conference.

Respectfully submitted,



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Date

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SPECIFICATION ADMENDMENT:

Please amend the specification as follows:

Page 9, lines 13-21, please replace the paragraph with the following replacement paragraph:

-- As shown in the drawings of FIG. 4A and FIG. 4B, cylinder-shaped conductors are taken as examples of the inner and outer conductors 404, 402. However, the coaxial via hole of the invention is not limited thereto. On the contrary, the inner and outer conductors can be in any shape only if the two conductors extend along with the Z-axis and are completely separated by an insulating fill. Therefore, any configurations of the two conductors with cross sections shaped in, for example, circle, oval round, rectangle are within the scope of the invention. Moreover, the configuration and the cross-section of the inner and outer conductors can be different from each other. --

CLAIM AMENDMENTS:

Claims 1-4 (Cancelled)

Claims 5-8 (Withdrawn)

Claims 9-11 (Cancelled)

Claims 12-16 (Withdrawn)

Claim 17 (Currently Amended): ~~The coaxial via hole as claimed in claim 1, A~~
coaxial via hole structure for a carrier, wherein the carrier has a first hole, the structure
comprising:

an outer cylinder-shaped conductor formed on the interior of the first hole and
extending along a first direction, wherein the outer cylinder-shaped conductor is~~has~~a
second hole therethrough and the second hole has a diameter smaller than a diameter
of the first hole, the outer cylinder-shaped conductor being connected to a signal
conductor for signal shielding;

an inner cylinder-shaped conductor formed on the interior of the second hole and
extending along the first direction so that the inner cylinder-shaped conductor is
disposed in the outer cylinder-shaped conductor; and

an insulating fill between the outer cylinder-shaped conductor and the inner cylinder-shaped conductor.

Claims 18-22 (Withdrawn)

Claim 23 (Currently Amended): ~~The coaxial via hole as claimed in claim 1, further comprising~~A coaxial via hole structure for a carrier, wherein the carrier has a first hole, the structure comprising:

an outer cylinder-shaped conductor formed on the interior of the first hole and extending along a first direction, wherein the outer cylinder-shaped conductor has a second hole therethrough and the second hole has a diameter smaller than a diameter of the first hole;

an inner cylinder-shaped conductor formed on the interior of the second hole and extending along the first direction so that the inner cylinder-shaped conductor is disposed in the outer cylinder-shaped conductor; and

an insulating fill between the outer cylinder-shaped conductor and the inner cylinder-shaped conductor; and

a conductor which is connected to the outer cylinder-shaped conductor and is connected to a signal conductor for signal shielding.

Claims 24 (Cancelled)

Claims 25-30 (Withdrawn)

Claim 31 (Cancelled)

Claim 32 (Currently Amended): ~~The coaxial via hole as claimed in claim 31,~~
~~further comprising:~~ A coaxial via hole structure for a carrier, wherein the carrier has a
first hole, the structure comprising:

an outer cylinder-shaped conductor formed on the interior of the first hole and
extending along a first direction, wherein the outer cylinder-shaped conductor has a
second hole therethrough and the second hole has a diameter smaller than a diameter
of the first hole;

an inner cylinder-shaped conductor formed on the interior of the second hole and
extending along the first direction so that the inner cylinder-shaped conductor is
disposed in the outer cylinder-shaped conductor;

an electrical-resistant fill between the outer cylinder-shaped conductor and the
inner cylinder-shaped conductor; and

a conductor which is connected to the outer cylinder-shaped conductor and is
connected to a signal conductor for signal shielding.

Claims 33-37 (Withdrawn)

Claims 38-39 (Cancelled)

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Claims 40-43 (Withdrawn)

Claims 44-46 (Cancelled)

Claims 47-50 (Withdrawn)

Claim 51 (Newly Presented): The coaxial via hole structure as claimed in claim 17, wherein the first direction is vertical to a direction along which the carrier extends.

Claim 52 (Newly Presented): The coaxial via hole structure as claimed in claim 17, wherein the carrier is a printed circuit board (PCB).

Claim 53 (Newly Presented): The coaxial via hole structure as claimed in claim 17, wherein the carrier is a substrate.

Claim 54 (Newly Presented): The coaxial via hole structure as claimed in claim 17, wherein the carrier at least comprises a conductive layer and the coaxial via hole structure penetrates a portion of the carrier.

Claim 55 (Newly Presented): The coaxial via hole structure as claimed in claim 17, wherein the carrier at least comprises a conductive layer and the coaxial via hole structure penetrates the carrier.

Claim 56 (Newly Presented): The coaxial via hole structure as claimed in claim 17, wherein a cross section, in a direction vertical to the first direction, of the outer cylinder-shaped conductor can be round or rectangular, and wherein a cross section, in

the direction vertical to the first direction, of the inner cylinder-shaped conductor can be round or rectangular.

Claim 57 (Newly Presented): The coaxial via hole structure as claimed in claim 17, wherein the insulating fill is made of a material with high dielectric constant.

Claim 58 (Newly Presented): The coaxial via hole structure as claimed in claim 32, wherein the first direction is vertical to a direction along which the carrier extends.

Claim 59 (Newly Presented): The coaxial via hole structure as claimed in claim 32, wherein the carrier is a printed circuit board (PCB).

Claim 60 (Newly Presented): The coaxial via hole structure as claimed in claim 32, wherein the carrier is a substrate.

Claim 61 (Newly Presented): The coaxial via hole structure as claimed in claim 32, wherein the carrier at least comprises a conductive layer and the coaxial via hole structure penetrates a portion of the carrier.

Claim 62 (Newly Presented): The coaxial via hole structure as claimed in claim 32, wherein the carrier at least comprises a conductive layer and the coaxial via hole structure penetrates the carrier.

Claim 63 (Newly Presented): The coaxial via hole structure as claimed in claim 32, wherein a cross section, in a direction vertical to the first direction, of the outer cylinder-shaped conductor can be round or rectangular, and wherein a cross section, in the direction vertical to the first direction, of the inner cylinder-shaped conductor can be round or rectangular.

DRAWING AMENDMENTS:

The attached sheets of drawings include changes to Figs. 2A, 2B, 6A, 6B, 7A, 8, and 10B. The sheets, which include Figs. 2A-2C, Figs. 6A-6B, Figs. 7A-7B, and Figs. 10A-10C, replace the original sheets including Figs. 2A-2C, Figs. 6A-6B, Figs. 7A-7B, and Figs. 10A-10C respectively.